Grade Four Mathematics

Domain *Operations and Algebraic Thinking*

Cluster ***Use the four operations with whole numbers to solve problems.***

Pacing

1st Quarter: Stepping Stones Modules 1, 2, 3
2nd Quarter: Stepping Stones Modules 4, 5, 6
3rd Quarter: Stepping Stones Modules 7, 8, 9
4th Quarter: Stepping Stones Modules 10, 11, 12

Standards

1. ***Interpret a multiplication equation as a comparison; e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.***

   Learning Targets:
   - I can explain how to compare a multiplication equation to a mathematical statement.
   - I can write a multiplication equation that represents a mathematical situation.

2. ***Multiply or divide to solve word problems involving multiplicative comparison; e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.***

   Learning Targets:
   - I can determine the correct operation to solve word problems.
   - I can solve a word problem using drawings and equations.
   - I can write an equation using a variable to represent the unknown.

3. ***Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.***

   Learning Targets:

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

From the K-8 Math Standards Progression.

<u>Prior Knowledge From Third Grade</u>

Represent and solve problems involving multiplication and division.

1. Interpret products of whole numbers; e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each.
   For example, describe a context in which a total number of objects can be expressed as 5 x 7.
2. Interpret whole-number quotients of whole numbers; e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.
   For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.
3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities;

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- I can use the correct operations to solve a multistep word problem.
- I can interpret remainders in word problems.
- I can use mental math and estimation to check if my answer is reasonable.

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e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
   For example, determine the unknown number that makes the equation true in each of the equations 8 x ? = 48, 5 = ☐ ÷ 3, 6 x 6 = ?.

Understand properties of multiplication and the relationship between multiplication and division.

5. Apply properties of operations as strategies to multiply and divide.
   Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known (commutative property of multiplication). 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30 (associative property of multiplication). Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56 (distributive property).
6. Understand division as an unknown factor problem.
   For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.

<u>Advances to Fifth Grade</u>

Write and interpret numerical expressions.

1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
   For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

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Content Vocabulary

- multiplication
- equation
- variable
- estimation
- remainders
- rounding

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Academic Vocabulary

- comparison
- interpret
- explain

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Formative Assessments

- Stepping Stones performance tasks, interviews, pretests

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Summative Assessments

- Stepping Stones

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Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain ***Operations and Algebraic Thinking***

Cluster ***Gain familiarity with factors and multiples.***

Pacing

1st Quarter: Stepping Stones Modules 1, 2, 3
2nd Quarter: Stepping Stones Modules 4, 5, 6
3rd Quarter: Stepping Stones Modules 7, 8, 9
4th Quarter: Stepping Stones Modules 10, 11, 12

Standards

4. Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.

Learning Targets:

- I can define factors and multiples.
- I can list all of the factor pairs for any whole number in the range 1-100.
- I can determine multiples of a given whole number (1-100).
- I can define prime and composite.
- I can determine if a number if prime or composite.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

From the K-8 Math Standards Progression.

Prior Knowledge From Third Grade

Multiply and divide within 100.

7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Advances to Fifth Grade

N/A

Content Vocabulary

- factors
- factor pairs
- multiples

Academic Vocabulary

- determine
- define
- recognize

• prime • composite • whole number	• list • explain • reason • apply
Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain ***Operations and Algebraic Thinking***

Cluster ***Generate and analyze patterns.***

Pacing

1st Quarter: Stepping Stones Modules 1, 2, 3
2nd Quarter: Stepping Stones Modules 4, 5, 6
3rd Quarter: Stepping Stones Modules 7, 8, 9
4th Quarter: Stepping Stones Modules 10, 11, 12

Standards

5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Learning Targets:

- I can generate (make) a pattern that follows a rule.
- I can identify (find) and explain (show) new patterns that go beyond the rule.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

From the K-8 Math Standards Progression.

Prior Knowledge From Third Grade

Solve problems involving the four operations, and identify and explain patterns in arithmetic.

8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

Advances to Fifth Grade

Analyze patterns and relationships.

	3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*
Content Vocabulary • pattern • rule	**Academic Vocabulary** • identify • explain • generate
Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain ***Number and Operations in Base Ten***

Cluster ***Generalize place value understanding for multi-digit whole numbers.***

Pacing

1st Quarter: Stepping Stones Modules 1, 2, 3
2nd Quarter: Stepping Stones Modules 4, 5, 6
3rd Quarter: Stepping Stones Modules 7, 8, 9
4th Quarter: Stepping Stones Modules 10, 11, 12

Standards

1. ***Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.***
   For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.

   Learning Targets:
   - I can explain the value of each digit in a multi-digit number as ten times the digit to the right.

2. ***Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.***

   Learning Targets:
   - I can read and write a multi-digit number in word form, base-ten numerals, and expanded form.
   - I can compare two multi-digit numbers using place value and record the comparison using symbols >, <, or =.

3. ***Use place value understanding to round multi-digit whole numbers to any place.***

   Learning Targets:
   - I can explain how to use place value and what digits to look for in order to round a multi-digit number.
   - I can use the value of the digit to the right of the place to be rounded to determine whether to round up or down.
   - I can write a multi-digit number rounded to any given place.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

From the K-8 Math Standards Progression.

Prior Knowledge From Third Grade

Use place value understanding and properties of operations to perform multi-digit arithmetic.

1. Use place value understanding to round whole numbers to the nearest 10 or 100.
2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.

Advances to Fifth Grade

Understand the place value system.

	1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. 2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. 3. Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form; e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. 4. Use place value understanding to round decimals to any place.
Content Vocabulary • expanded form • round	**Academic Vocabulary** • recognize • compare
Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain ***Number and Operations in Base Ten***	
Cluster ***Use place value understanding and properties of operations to perform multi-digit arithmetic.***	**Pacing** **1st Quarter:** Stepping Stones Modules 1, 2, 3 **2nd Quarter:** Stepping Stones Modules 4, 5, 6 **3rd Quarter:** Stepping Stones Modules 7, 8, 9 **4th Quarter:** Stepping Stones Modules 10, 11, 12
Standards ***4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.*** **Learning Targets:** • I can fluently add multi-digit whole numbers using the standard algorithm. • I can fluently subtract multi-digit whole numbers using the standard algorithm. ***5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.*** **Learning Targets:** • I can multiply a multi-digit number (up to 4 digits) by a one-digit whole number and illustrate and/or explain my strategy. • I can multiply 2 two-digit numbers and illustrate and/or explain my strategy. ***6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.*** **Learning Targets:** • I can divide a multi-digit dividend (up to 4 digits) by a one-digit divisor and illustrate and/or explain my strategy.	**Content Elaborations** **Standards of Mathematical Practice** ***Mathematically proficient students:*** 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. **From the K-8 Math Standards Progression.** **<u>Prior Knowledge From Third Grade</u>** ***Use place value understanding and properties of operations to perform multi-digit arithmetic.*** 1. Use place value understanding to round whole numbers to the nearest 10 or 100. 2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. 3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations. **<u>Advances to Fifth Grade</u>** ***Understand the place value system.***

	1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. 2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. 3. Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form; e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. 4. Use place value understanding to round decimals to any place. Perform operations with multi-digit whole numbers and with decimals to hundredths. 5. Fluently multiply multi-digit whole numbers using the standard algorithm. 6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. 7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
Content Vocabulary • standard algorithm • multi-digit • rectangular array • area model • quotient • dividend • divisor	**Academic Vocabulary** • illustrate • strategy

Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain *Number and Operations—Fractions*

Cluster ***Extend understanding of fractions equivalence and ordering.***

Pacing

1st Quarter: Stepping Stones Modules 1, 2, 3
2nd Quarter: Stepping Stones Modules 4, 5, 6
3rd Quarter: Stepping Stones Modules 7, 8, 9
4th Quarter: Stepping Stones Modules 10, 11, 12

Standards

1. ***Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.***

   Learning Targets:
   - I can explain why fractions are equivalent using models.
   - I can generate equivalent fractions by multiplying or dividing the numerator and denominator by the same number.
   - I can draw a model to prove why multiplying or dividing the numerator and denominator by the same number generates equivalent fractions.

2. ***Compare two fractions with different numerators and different denominators; e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions; e.g., by using a visual fraction model.***

   Learning Targets:
   - I can compare two fractions by thinking about their size or location on a number line, or comparing them to a benchmark fraction (0/2, 1/2, 2/2).
   - I can compare two fractions by generating equivalent fractions with common denominators.
   - I can record the comparison using symbols (<, =, >) and justify each comparison.
   - I can explain that comparing fractions can only be done when they refer

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

From the K-8 Math Standards Progression.

<u>Prior Knowledge From Third Grade</u>

Develop understanding of fractions as numbers.

1. Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.
2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.
   a. Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
   b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

to the same whole.	3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size or the same point on a number line. b. Recognize and generate simple equivalent fractions; e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent; e.g., by using a visual fraction model. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions; e.g., by using a visual fraction model. **<u>Advances to Fifth Grade</u>** ***Use equivalent fractions as a strategy to add and subtract fractions.*** 1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)* 2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators; e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*
Content Vocabulary • fraction • equivalent fractions • numerator • denominator	**Academic Vocabulary** • generate • model • comparison • symbol

• benchmark fraction • common denominator • whole	• justify
Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain	***Number and Operations—Fractions***
Cluster	***Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.***

Pacing

1st Quarter: Stepping Stones Modules 1, 2, 3
2nd Quarter: Stepping Stones Modules 4, 5, 6
3rd Quarter: Stepping Stones Modules 7, 8, 9
4th Quarter: Stepping Stones Modules 10, 11, 12

Standards

3. Understand a fraction a/b with a > 1 as a sum of fractions 1/b.

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions; e.g., by using a visual fraction model.
Examples: 3/8 = 1/8 + 1/8 + 1/8; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.
c. Add and subtract mixed numbers with like denominators; e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators; e.g., by using visual fraction models and equations to represent the problem.

Learning Targets:

- I can use visual models to add and subtract fractions within the same whole.
- I can use visual models to decompose a fraction in more than one way, such as breaking down a fraction into a sum of its unit fraction.
- I can record decomposition in an equation.
- I can add or subtract a mixed fraction using equivalent fraction, properties of operations, or the relationship between addition and subtraction.
- I can solve addition and subtraction word problems using drawings, pictures, and equations.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

From the K-8 Math Standards Progression.

Prior Knowledge From Third Grade

N/A

Advances to Fifth Grade

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

3. Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers; e.g., by using visual fraction models or equations to represent the problem.
For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice

4. *Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.*

a. Understand a fraction a/b as a multiple of 1/b.
For example, use a visual fraction model to represent 5/4 as the product 5 x (1/4), recording the conclusion by the equation 5/4 = 5 x (1/4).

b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number.
For example, use a visual fraction model to express 3 x (2/5) as 6 x (1/5), recognizing this product as 6/5. (In general, n x (a/b) = (n x a)/b.)

c. Solve word problems involving multiplication of a fraction by a whole number; e.g., by using visual fraction models and equations to represent the problem.
For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?

Learning Targets:

- I can explain why a/b = ax1/b by using visual models to show how to decompose fractions into unit fractions and represent it as a multiple of unit fractions.
- I can decompose a fraction into a multiple of unit fractions.
- I can solve word problems that involve multiplying a whole number and fraction with visual models and equations.

should each person get? Between what two whole numbers does your answer lie?

4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
   a. Interpret the product (a/b) x q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q ÷ b.
   For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation. Do the same with (2/3) x (4/5) = 8/15. (In general, (a/b) x (c/d) = ac/bd.)
   b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
5. Interpret multiplication as scaling (resizing) by:
   a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
   b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n x a)/(n x b) to the effect of multiplying a/b by 1.
6. Solve real world problems involving multiplication of fractions and mixed numbers; e.g., by using visual fraction models or equations to represent the problem.
7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
   a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients.
   For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) x 4 = 1/3.
   b. Interpret division of a whole number by a unit fraction, and compute such quotients.

	For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 x (1/5) = 4. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions; e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*
Content Vocabulary • fraction • multiple • unit fraction • numerator • denominator • mixed number • equivalent fractions • addition • subtraction • multiply	**Academic Vocabulary** • solve • decompose • explain • visual models • record
Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain ***Number and Operations—Fractions***	
Cluster ***Understand decimal notations for fractions, and compare decimal fractions.***	**Pacing** **1st Quarter:** Stepping Stones Modules 1, 2, 3 **2nd Quarter:** Stepping Stones Modules 4, 5, 6 **3rd Quarter:** Stepping Stones Modules 7, 8, 9 **4th Quarter:** Stepping Stones Modules 10, 11, 12
Standards ***5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.*** *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.* **Learning Targets:** • I can rewrite a fraction with a denominator 10 as an equivalent fraction with denominator 100. • I can add two fractions with denominators 10 and 100. ***6. Use decimal notation for fractions with denominators 10 or 100.*** *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.* **Learning Targets:** • I can explain the relationship between a fraction and the decimal representation. • I can represent fractions with denominators of 10 and 100 as a decimal. • I can identify the tenths and hundredths place of a decimal. • I can show the placement of a decimal on a number line. ***7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions; e.g., by using a visual model.*** **Learning Targets:** • I can explain that comparing two decimals is valid only when they refer to the same whole.	**Content Elaborations** **Standards of Mathematical Practice** ***Mathematically proficient students:*** 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. **From the K-8 Math Standards Progression.** **<u>Prior Knowledge From Third Grade</u>** ***N/A*** **<u>Advances to Fifth Grade</u>** ***Apply and extend previous understandings of multiplication and division to multiply and divide fractions.*** 3. Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers; e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice*

• I can justify the comparison by reasoning about the size of the decimals and by using a visual model. • I can compare two decimals to the hundredths place and record the comparison using symbols: <, >, or =.	*should each person get? Between what two whole numbers does your answer lie?* 4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product (a/b) x q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q ÷ b. *For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation. Do the same with (2/3) x (4/5) = 8/15. (In general, (a/b) x (c/d) = ac/bd.)* b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. 5. Interpret multiplication as scaling (resizing) by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n x a)/(n x b) to the effect of multiplying a/b by 1. 6. Solve real world problems involving multiplication of fractions and mixed numbers; e.g., by using visual fraction models or equations to represent the problem. 7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) x 4 = 1/3.* b. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions;

	e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*
Content Vocabulary • fraction • equivalent fraction • numerator • denominator • decimal	**Academic Vocabulary** • compare
Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain ***Measurement and Data***

Cluster ***Solve problems involving measurement and conversion of measurement from a larger unit to a smaller unit.***

Pacing

1st Quarter: Stepping Stones Modules 1, 2, 3
2nd Quarter: Stepping Stones Modules 4, 5, 6
3rd Quarter: Stepping Stones Modules 7, 8, 9
4th Quarter: Stepping Stones Modules 10, 11, 12

Standards

1. ***Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.***
   For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...

   Learning Targets:
   - I can describe relationships between units of measurements.
   - I can record equivalent measures within a 2 column table.

2. ***Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.***

   Learning Targets:
   - I can solve word problems involving various measurements expressed by whole numbers, fractions, and decimals.
   - I can convert a measurement given in a larger unit into an equivalent measurement in smaller units in order to solve a problem.

3. ***Apply the area and perimeter formulas for rectangles in real world and mathematical problems.***

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

From the K-8 Math Standards Progression.

Prior Knowledge From Third Grade

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

1. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes; e.g., by representing the problem on a number line diagram.
2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units; e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

Learning Targets: • I can explain the formulas for area and perimeter. • I can use the formulas for area and perimeter to solve real world problems.	**<u>Advances to Fifth Grade</u>** ***Convert like measurement units within a given measurement system.*** 1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
Content Vocabulary • metric units • standard units • scale	**Academic Vocabulary** • convert
Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain ***Measurement and Data***

Cluster ***Represent and interpret data.***

Pacing

1st Quarter: Stepping Stones Modules 1, 2, 3
2nd Quarter: Stepping Stones Modules 4, 5, 6
3rd Quarter: Stepping Stones Modules 7, 8, 9
4th Quarter: Stepping Stones Modules 10, 11, 12

Standards

4. ***Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.***
   For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.

Learning Targets:

- I can create a line plot with a given set of data using fractions as a unit.
- I can use the information on the line plot to solve addition and subtraction problems.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

From the K-8 Math Standards Progression.

Prior Knowledge From Third Grade

Represent and interpret data.

3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.
   For example, draw a bar graph in which each square in the bar graph might represent 5 pets.
4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

	<u>Advances to Fifth Grade</u> ***Represent and interpret data.*** 2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*
Content Vocabulary • line plot • fraction • data set • unit	**Academic Vocabulary** • create
Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain	***Measurement and Data***
Cluster	***Geometric measurement: Understand concepts of angle and measure angles.***

Pacing

1st Quarter: Stepping Stones Modules 1, 2, 3
2nd Quarter: Stepping Stones Modules 4, 5, 6
3rd Quarter: Stepping Stones Modules 7, 8, 9
4th Quarter: Stepping Stones Modules 10, 11, 12

Standards

5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.

a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

Learning Targets:

- I can identify the parts of an angle (vertex, common endpoint, rays) and define an angle.
- I can explain that an angle is measured in degrees related to the 360 degrees in a circle.

6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

Learning Targets:

- I can measure an angle using a protractor in whole-number degrees.
- I can sketch angles with a given measurement.
- I can use a protractor to create a given angle measurement.

7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

From the K-8 Math Standards Progression.

Prior Knowledge From Third Grade

Geometric measurement: Understand concepts of area and relate area to multiplication and to addition.

5. Recognize area as an attribute of plane figures and understand concepts of area measurement.
   a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
   b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
7. Relate area to the operations of multiplication and addition.
   a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying

find unknown angles on a diagram in real world and mathematical problems; e.g., by using an equation with a symbol for the unknown angle measure.

Learning Targets:

- I can explain that the angle measurement of a larger angle is the sum of the angle measures of its decomposed parts.
- I can write an equation with an unknown angle measurement.
- I can use addition and subtraction to solve for the missing angle measurements.
- I can solve word problems involving unknown angles.

the side lengths.

b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a x b and a x c. Use area models to represent the distributive property in mathematical reasoning.

d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

Geometric measurement: Recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Advances to Fifth Grade

Geometric measurement: Understand concepts of volume and relate volume to multiplication and to addition.

3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
   a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
   b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
   a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold

	whole-number products as volumes; e.g., to represent the associative property of multiplication. b. Apply the formulas V = 1 x w x h and V = b x h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems. c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
Content Vocabulary • ray • endpoint • angle • degrees • arc • protractor • sum • decomposed parts • equation	**Academic Vocabulary** • identify • define • explain • related • sketch • given • create • solve
Formative Assessments • Stepping Stones performance tasks, interviews, pretests	**Summative Assessments** • Stepping Stones
Resources • Stepping Stones	**Enrichment Strategies**
Integrations	**Intervention Strategies**

Grade Four Mathematics

Domain *Geometry*	
Cluster ***Draw and identify lines and angles, and classify shapes by properties of their lines and angles.***	**Pacing** **2nd Quarter:** Stepping Stones Module 5 **4th Quarter:** Stepping Stones Module 10
Standards 1. ***Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.*** **Learning Targets:** • I can draw an example of a point, line, line segment, ray, right angle, acute angle, obtuse angle, perpendicular lines, and parallel lines. • I can look for and identify the following in a given two-dimensional figure: point, line, line segment, ray, right angle, acute angle, obtuse angle, perpendicular lines, and parallel lines. 2. ***Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.*** **Learning Targets:** • I can classify two-dimensional shapes into the following categories: those with both parallel and perpendicular lines, those with no parallel or perpendicular lines. • I can classify two-dimensional shapes into categories based on the presence or absence of acute, obtuse, or right angles. • I can identify a right triangle. 3. ***Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.*** **Learning Targets:**	**Content Elaborations** **Standards of Mathematical Practice** ***Mathematically proficient students:*** 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. **From the K-8 Math Standards Progression.** **<u>Prior Knowledge From Third Grade</u>** ***Reason with shapes and their attributes.*** 1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. 2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.* **<u>Advances to Fifth Grade</u>** ***Graph points on the coordinate plane to solve real-world and mathematical***

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- I can identify line-symmetric figures.
- I can define line of symmetry.
- I can explain how to identify it in a two-dimensional figure.
- I can explain how folding along the line of symmetry results in matching parts.
- I can draw a line on a figure to create two symmetric figures.

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problems.

1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Classify two-dimensional figures into categories based on their properties.

3. Understand that attributes belonging to a category of two dimensional figures also belong to all subcategories of that category.
   For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
4. Classify two-dimensional figures in a hierarchy based on properties.

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Content Vocabulary

- point
- line
- line segment
- ray
- angle
- right angle
- acute angle
- obtuse angle
- perpendicular
- parallel

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Academic Vocabulary

- classify

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Formative Assessments

- Stepping Stones performance tasks, interviews, pretests

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Integrations	Intervention Strategies